

Biodiversity Through the Lens of Bird Flocks

Loyola University Chicago

Authors: Lucas Ochoa, Brian Thompson, Grace Whitten
Mentor: Fr. Stephen Mitten S.J.

Abstract

Birds are known bioindicators for ecosystems worldwide. At Inkaterra Reserva Amazónica located in the Madre de Dios region of Perú, it's no different. Inkaterra Reserva Amazónica is home to over 480 different bird species and frequently engages in bird monitoring. We noted every identifiable species of bird we saw or heard and chose to focus on mixed-species flocks (MSF) of birds to observe biodiversity within one collective group. In our study, we saw a total of 141 species of birds. We saw 4 different MSF with 24 species and ~60 individuals total. By focusing on MSF, we were able to gather observations of bird behavior and species interactions. While observing MSF and the different species within them, we were able to witness the importance of citizen science through collecting data via eBird.

Introduction

Maintaining biodiversity is a crucial requirement for the survival of our planet since it influences the overall functionality of an ecosystem.¹ One method to counteract a decline in biodiversity is through sections of land designated for natural wildlife. Once protected environments are established, observational studies are valuable when quantifying species diversity. Birds are an excellent indicator for diversity and environmental health since they are diurnal and easy to monitor through standard bird watching. A specific method of analyzing birds is through flock monitoring. Flocks can vary from heavily structured or loose collectives. The overall benefits to any flock include more efficient foraging, increased mating opportunities, and decreased predation rates. Birds of different species can form a flock, giving rise to a MSF. MSF are a collective of birds of varying species that move together, especially to forage. There are two structural roles that species in a MSF can have, either leader or follower. Leader species will lead the flock and attract follower species to join opportunistically. It is also known that specifically MSF can be used as an ecological indicator.² We were able to see these flocks in action thanks to the Inkaterra Ecological Reserve. The Inkaterra Ecological Reserve is an exceptional Neotropical protected area that Loyola students were able to explore for academic purposes. It is home to over 480 bird species and frequently studies these species through community science and bird monitoring efforts. By documenting MSF, our group wished to observe biodiversity and species interactions.



Figure 1.
Tangara chilensis
Paradise Tanager

Figure 2.
Tangara mexicana
Turquoise Tanager

Figure 3.
Tangara schrankii
Green-and-gold Tanager

Methods and Research Design

Through the duration of our 6 day stay at Inkaterra Reserva Amazónica, we observed different species of birds opportunistically and developed our focus on MSF. Bird watching was consistently ongoing within our daily hiking, field work, and tour activities. Birds were monitored through the community science app eBird and identified using a Birds of Peru index within the Merlin app. When a flock was spotted, group members assembled and tracked location, time, flock type, species, quantity, behavior, and other comments on the congregation. Our Inkaterra field guides were valuable resources and provided further details about specific bird species and interactions.

Results

Date	Time	Location	Flock Type	Species Name (Quantity)	Behavior	Notes
Mar 8, 2022	6:56 am	Emergent layer/canopy	Mixed Foraging Flock	Green-and-gold tanager Guira tanager Opal-rumped tanager Paradise tanager Turquoise tanager Yellow-bellied tanager (6 species and 6 indiv. total)	Communicating, foraging, relocating. No clear lead/follow.	In ficus trees near look out.
Mar 8, 2022	12:27 pm	~30-40ft high (by reserve lodge)	Mixed Foraging Flocks	Crested Oropendola Russet-backed Oropendola (both ~ 30) Purplish Jay (>2) Violaceous Jay (> 5) (4 species and ~40 indiv. in total)	Communicating (vocally), foraging. Oropendolas leading, jays following.	Both species known to eat insects & fruit.
Mar 10, 2022	8:00 am	Understory (dense forest)	Mixed	Collared Puffbird Dusky-throated Antshrike Eloquent Woodcreeper Gray Antbird Gray Antwren (5 species and 5 indiv. in total)	Communicating, foraging, relocating. Dusky-throated Antshrike leading, rest following.	On walk with guide (Noe).
Mar 10, 2022	8:30 am	Emergent layer/canopy (bare vegetation)	Mixed	Black-tailed Trogon Gray-crowned Flycatcher Guira Tanager Lemon-throated Barbet Palm Tanager Rufous-tailed Foliage Gleaner Spot-winged Antshrike White-winged Shrike-Tanager Yellow-margined Flycatcher (9 species and 9 indiv. in total)	Communicating, dancing, feeding. No clear lead/follow.	^



Figures 5 & 6. Same species in both photographs. Left: *Psarocolius decumanus* | Crested Oropendola
Right: *Cyanocorax violaceus* | Violaceous Jay

Discussion & Conclusion

Our observations supported the idea that mixed-species flocks display biodiversity and intricate social interactions. We were able to see five quality flocks from both mixed and uniform species. We successfully identified numerous birds in one large area, including birds that were considered rare to Inkaterra. Table 1 describes all findings and observations made in each flock. We were able to identify a leader on March 10th in the understory as well as on March 8th by the lodge. The leader on March 10th was claimed to be the Dusky-throated Antshrike. The March 8th sighting was led by the Oropendolas while the Jays followed. The species composition of each of our MSF sightings was not unusual.⁶⁻⁶ Using eBird and Merlin, we were able to identify which birds were uncommon to the region. Some birds that stand out are the Collared Puffbird and Palm Tanager. Overall, we believe that investigating flocks can enhance the observations made during standard birding. These observations can lead to important data regarding the biodiversity in an area. We hope to work with Inkaterra in the near future for further studies on bird diversity within the Neotropical region.

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